

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
19 February 2004 (19.02.2004)

PCT

(10) International Publication Number  
**WO 2004/015692 A3**

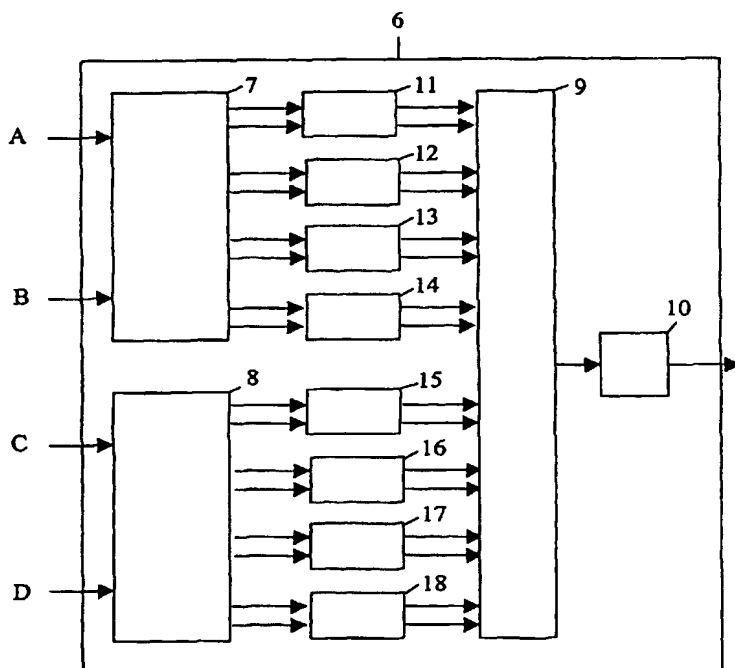
- (51) International Patent Classification<sup>7</sup>: **G11B 7/09**
- (21) International Application Number:  
PCT/IB2003/003293
- (22) International Filing Date: 21 July 2003 (21.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
02078239.7 6 August 2002 (06.08.2002) EP
- (71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **VOORMAN, Johannes, O.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **DE JONG, Gerben, W.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **BREKELMANS, Johannes, H., A.** [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: **DUIJVESTIJN, Adrianus, J.**; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declaration under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,

[Continued on next page]

(54) Title: OPTICAL DISK SYSTEM WITH DELAY-DIFFERENCE DETECTOR WITHOUT DELAY LINES



(57) Abstract: Optical disk systems comprising photo detectors (1) for detecting optical disks comprising amplifiers and slicers (2-5) and delay-difference detectors (6) for detecting delay differences in sliced amplified detection signals are improved by installing delaylineless delay-difference detectors (6) comprising combinatorial-logic circuits (7,8) like inverters, ORs, NORs, ANDs, NANDs and sequential-logic circuits (11-18) like SetResetFlipFlops. Without the prior art delay lines, said delay-difference detectors (6) are of a lower complexity and low costly and can be well integrated. By introducing a first pair of sequential-logic circuits (11,12,15,16) for detecting delay differences between rising edges and a second pair of sequential-logic circuits (13,14,17,18) for detecting delay differences between falling edges, both kinds of edges are being used and the influence of time-jitter is less compared to the situation where just one kind of edge is used. Said delay-difference detector (6) further comprises an analog adder/subtractor (9) for adding/ subtracting sequential-logic circuit output signals and low pass filter(s) (10) located before or after said adder/subtractor (9).



CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE,

DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

**Published:**

— with international search report

**(88) Date of publication of the international search report:**

29 April 2004

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 03/03293

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G11B7/09

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 808 979 A (ISHIBASHI HIROMICHI ET AL) 15 September 1998 (1998-09-15) the whole document	1-10
Y	-----	11
Y	EP 1 096 481 A (SAMSUNG ELECTRONICS CO LTD) 2 May 2001 (2001-05-02) abstract paragraph '0045! - paragraph '0061!; figures 4-8 -----	11



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

29 January 2004

Date of mailing of the international search report

12/02/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
 Fax: (+31-70) 340-3016

Authorized officer

Annibal, P

**INTERNATIONAL SEARCH REPORT**  
 information on patent family members

International Application No  
**PCT/IB 03/03293**

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5808979	A	15-09-1998	JP	3336778 B2	21-10-2002
			JP	8147724 A	07-06-1996
			KR	222192 B1	01-10-1999
<hr/>					
EP 1096481	A	02-05-2001	KR	2001039382 A	15-05-2001
			CN	1300054 A	20-06-2001
			EP	1096481 A2	02-05-2001
			JP	2001155354 A	08-06-2001
			US	6584049 B1	24-06-2003
<hr/>					